C l a i m s

1.

A thermodynamic cracking process, **characterised** in that cracking takes place in a cyclone reactor and in a riser with varying diameter under the influence of a rotating and turbulent fluidised energy carrier in the form of fine grained minerals, whereby the particles are put in motion from the regenerator through two exit lines with outlet under the level of the fluidzed bed and are transported to the riser by combustion gases in the fluidization reactor.

2.

The thermodynamic process in accordance with claim 1, **characterised** in that the energy carrier is selected from fine grained minerals, such as silica, magnesium oxide, aluminum oxide, copper oxide, anorthisite, olivine or similar materials.

3.

The thermodynamic process in accordance with claim 1, **characterised** in that the reactor cyclone has an entrance which is diverting the flow of catalyst and gases whereby they will be subject to strong mechanical shear forces and where the catalyst may be evacuated from the reactor cyclone and be discharged to a regenerator via a rotating valve system and/or another closing device.

4.

The thermodynamic process in accordance with claim 1 and/or 3, **characterised** in that the deactivated energy carrier is regenerated in a fluidised regeneration chamber having a fluidizing perforated plate above a plenum receiving either combustion gases or air and where the energy carrier is regenerated by oxidizing co-accumulated coke contained therein.

5.

The thermodynamic process in accordance with claim 4, **characterised** in that the regenerator comprises a heat exchanger to control the temperature of the energy carrier in the reactor by steam generation in the heat exchanger.

6.

The thermodynamic process in accordance with any of claims 1, 3, 4 and 5, **characterised** in that regenerated energy carrier is transported pneumatically, i.e. without gravitational fall, through the riser by all, or a part of, the stream of combustion gases.

7.

The thermodynamic process in accordance with any of the preceding claims, **characterised** in that the coke which is oxidized on the energy carrier substantially supplies the energy for the operation of the process.

8.

The thermodynamic process in accordance with any of the preceding claims **characterised** in that the product gases are passed to a suitable condensing system consisting of an oil- or steam condenser or a distillation column.

9.

The thermodynamic process in accordance with any of the preceding claims, **characterised** in that the feed oil is preheated by the heat of condensation of the gases and that the oil is atomized in a nozzel having a central inlet for steam, whereby the pressure is preset by springs and the oil in the surrounding chamber is passed to a ring slot where steam hits the oil film and beaks it up into droplets.

10.

A thermodynamic cracking unit, **characterised** in that it comprises a cyclon reactor and a riser of varying diameter, whereby the inlet of the cyclone reactor is provided in the lower part of the reactor, in order to bring the particles into an upward circulating

movement with large shear and centrifugational forces, a perforated fluidizing plate situated approximately half a diameter from the bottom of the regenerator over a plenum for the regeneration of the energy carrier, as well as a heat exchanger, provided in the fluidized bed of the particles in the regenerator, in order to control the temperature.

11.

The thermodynamic cracking unit in accordanse with claim 10, **characterised** in that the varying diameter of the riser leads to acceleration and retardation of the stream of gas and particulate energy carriers leading to velocity variations between the gas and the particles and thereby an optimalization of the collisions between the particles and the oil drops injected in the riser and thereby optimalization of the energy transfer and mechanical collision forces between the particles and the oil droplets.

12.

The thermodynamic cracking unit in accordance with claim 11, **characterised** in that the colliding particles in the riser of varying diameter leads to sonoluminiscense caused by the fact that gas trapped in cavities on the particles and between these are exposed to adiabatic compression whereby temperature and pressure of the gas bubbles are increased and sonoluminescense is created by splitting of the molecules in the gas, which can be oil gas or steam, and emits light and by the fact that part of the oxygen radicals binds to the splitted oil molecules and thereby results in hydrogenation of the oil.